PROJECT TITLE   : SALAMANDER-II

PERIOD COVERED   : JANUARY - APRIL 1981

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1   Effect of Increased Path Length Between Smoking Machine
    and Cysteine Solution on ISH Values

Before continuing trials with a cold trap (1), the
influence of the trap at room temperature on the ISH
was checked.   In fact this trap adds 180 cm between
the smoking machine and the cysteine solution.

In addition, measurements which were made with the path
length increased to 350 cm and to 520 cm.

The residual reactivity of the smoke gas phase was
demonstrated by several measurements in which a second
cysteine containing flask was placed after the first.

Table 1 summarizes the results.   ISH $_1$ is the normal
ISH and ISH$_2$ the value found with the second flask

Table 1 : Influence of Path Length on the ISH

cigarette	path length	ISH $_1$	ISH $_2$
ØS-B TOT	normal	35	35
	+ 180 cm	35	35
	+ 350 cm	34	36
	+ 520 cm	32	-
ØS-B-TOT/SPO	normal	20	
	+ 180 cm	20	
ØS-B-TOT/SPO II	normal	89	
	+ 180 cm	87	

Comments

- There is no relation between the ISH value and the elimination of the following smoke components :

    - organic gas-phase
    - NO_2, N_2O_3, N_2O_5
    - CO_2, NH_3

- An almost complete elimination of NO leads to a decrease of about 50% in the ISH, but a decrease of 40% in the NO does not influence the ISH. In addition, the direct influence of NO is not proved by these experiments.

    The CO may contribute to ISH, but cannot be the only component responsible for it.

- A second flask containing the same amount of cysteine solution was placed after the normal reaction flask, for a measurement with a cold trap at -140^0C.

    These results indicate that the reactivity of the gas-phase does not change with increased path length. These path length increases also correspond to increased age of the gas-phase. In conclusion, those compounds reacting with cysteine are only stable compounds and not free radicals, which would be too unstable to remain in the gas-phase after the traps.

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The gas-phase of 3 different cigarettes (from Project SPOTLESS) was trapped at -117^0C, -130^0C, -140^0C, -150^0C, 160^0C and -165^0C.

The ISH was measured in each case.   The NO and CO deliveries after the traps were also measured.   The complete elimination of the organic components of the gas-phase was demonstrated at -117^0C.

Table 2 shows all the results obtained with the cold traps.

Figure 1 illustrates the variation of ISH with cold traps at different temperatures.

The value of ISH_2 was the same as that at 20^0C.

The reactivity and the behaviour of the smoke with cysteine remains constant even when the main part of the gas-phase is eliminated.

3   Continuation of Work
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Trials are presently under way using pure gases alone or in mixtures (NO, CO, O_2) to see their effects on the cysteine.

A study concerning the relation between the concentration of the cysteine solution and the number of cigarettes smoked is also under way.

These last mentioned results will appear in the next Monthly Report.   A final Report on Project SALAMANDER-II is being prepared.

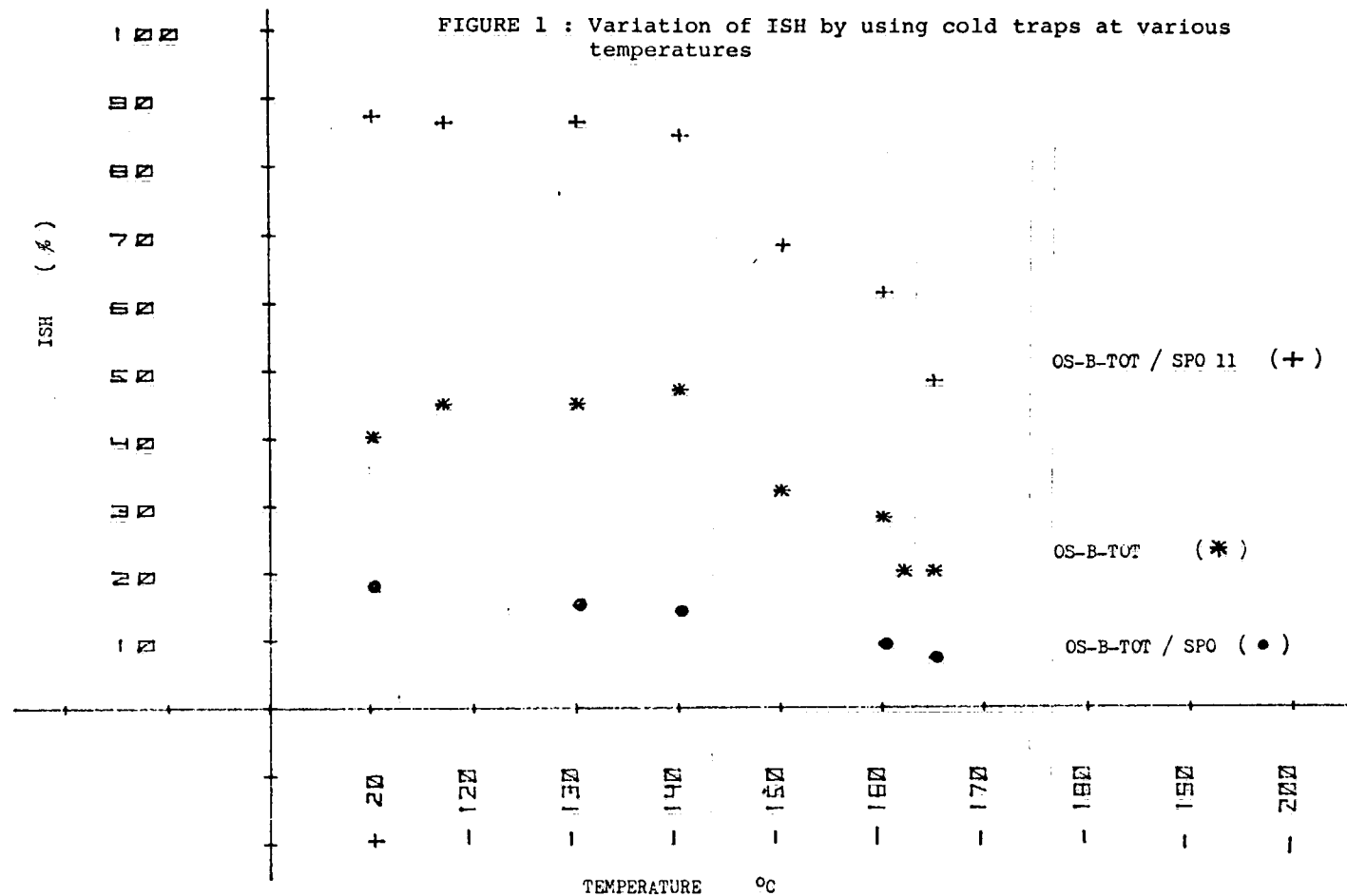REFERENCE

(1) Genoud-Y. Monthly Report p. 12 (November 1980).

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Table 2 Influence of the Cold Traps on ISH, NO and CO

Cigarette	Temperature ^0C	ISH %	NO decrease %	CO decrease
ØS-B-TOT	20	40	10	0
	-117	45	23	0
	-130	45	30	0
	-140	47	36	0
	-150	32	50	0
	-160	28	86	0
	-165	20	98	0
ØS-B-TOT/SPO	20	20	NO level too low to be significant for measurable differences	0
	-117	20		
	-140	14		
	-160	9		
	-165	7		0
ØS-B-TOT/SPOII	20	87	10	0
	-117	86	54	0
	-140	84	60	0
	-150	72	83	0
	-160	61	88	0
	-165	48	96	0

FIGURE 1 : Variation of ISH by using cold traps at various temperatures

ISH (%)

100

90

80

70

60

50

OS-B-TOT / SPO 11   (+)

40

30

OS-B-TOT   (*)

20

10   OS-B-TOT / SPO   (•)

20 120 130 140 150 160 170 180 190 200

TEMPERATURE   °C

- 10 -